

[Name of Document] What Is Claimed Is

[Claim 1] A two-fluid nozzle for cleaning substrates which mixes gas and liquid internally and injects liquid droplets with gas so as to clean a substrate, comprising:

5 a gas supply passage for supplying gas, a liquid supply passage for supplying liquid, and a lead-out passage for leading out internally-formed liquid droplets,

wherein an injection port for injecting liquid droplets to the outside is formed at the front end of said lead-out passage, and

10 wherein a cross-sectional area S_b of said injection port is formed smaller than a cross-sectional area S_a of said lead-out passage, and a cross-sectional area S_c of an exit of said gas supply passage is formed smaller than the cross-sectional area S_a of said lead-out passage.

[Claim 2] The two-fluid nozzle for cleaning substrates as set forth in
15 claim 1,

wherein a ratio $S_a : S_b$ between the cross-sectional area S_a of said lead-out passage and the cross-sectional area S_b of said injection port is 1 : 0.25 to 0.81.

[Claim 3] The two-fluid nozzle for cleaning substrates as set forth in
20 claim 1,

wherein the cross-sectional area S_c of the exit of said gas supply passage is formed equal to the cross-sectional area S_b of said injection port or smaller than the cross-sectional area S_b of said injection port.

[Claim 4] The two-fluid nozzle for cleaning substrates as set forth in
25 claim 3,

wherein a ratio $S_b : S_c$ between the cross-sectional area S_b of said

injection port and the cross-sectional area S_c of the exit of said gas supply passage is 1 : 0.16 to 0.87.

[Claim 5] The two-fluid nozzle for cleaning substrates as set forth in claim 4,

5 wherein the cross-sectional area S_c of the exit of said gas supply passage is 1.13 mm^2 to 6.16 mm^2 .

[Claim 6] The two-fluid nozzle for cleaning substrates as set forth in claim 4,

10 wherein the cross-sectional area S_c of the exit of said gas supply passage is 1.77 mm^2 to 4.91 mm^2 .

[Claim 7] The two-fluid nozzle for cleaning substrates as set forth in claim 1,

wherein said lead-out passage is formed in a straight shape, and the cross-sectional area S_a of said lead-out passage is constant.

15 [Claim 8] The two-fluid nozzle for cleaning substrates as set forth in claim 1,

wherein a length L_1 of said lead-out passage is 10 mm to 90 mm.

[Claim 9] The two-fluid nozzle for cleaning substrates as set forth in claim 1,

20 wherein a length L_2 of said injection port is 30 mm or shorter.

[Claim 10] The two-fluid nozzle for cleaning substrates as set forth in claim 1, comprising a liquid introduction passage in an annular shape surrounding said gas supply passage, and having a structure such that

25 said gas supply passage is arranged coaxially with said lead-out passage,

said liquid supply passage is opened on an outer peripheral face of

said liquid introduction passage,

a taper portion is formed with a diameter which gets smaller toward a front end side in said liquid introduction passage,

the taper portion is opened between said gas supply passage and said 5 lead-out passage, and

gas supplied from said gas supply passage and liquid introduced from said liquid introduction passage are mixed to form liquid droplets and the liquid droplets are lead out via said lead-out passage.

[Claim 11] The two-fluid nozzle for cleaning substrates as set forth in 10 claim 1,

wherein said injection port is formed with a vertical cross-sectional shape of an exit side periphery having a right angle or an acute angle.

[Claim 12] A substrate cleaning apparatus, comprising:

a two-fluid nozzle for cleaning substrates as set forth in claim 1;

15 a spin chuck for holding a substrate substantially horizontally; and

a drive mechanism for moving said two-fluid nozzle for cleaning substrates above the substrate.